Difficultly inflammable polyester resins ...

chloromethylmethylolmethane)polydichloromethyldimethylolmethanemaleate-phthalate: Maleic and phthalic anhydride, as well as dichloromethylmethylol-methane (somewhat less than stoichiometric ratio) were mixed and the reaction carried out by mixing with CO_2 stream. Heating occurs in a metal bath (Wood's alloy) and the temperature was raised stepwise. The polyesterification process is controlled by the change in acid number and the yield of the condensate. At 180°C pentaerythrite trichlorohydrine is added in such an amount that the total content in hydroxyl groups in the reaction is predominant. Duration of the process is 8-8.5 hrs. Characteristics of the obtained polyester are: solid glass-like transparent substance, acid number 46, esterification degree 90.7, melting point 40°C. This resin was mixed with styrene on a water bath at 70°C using as inhibitor 0.01% hydroquinone. Properties of the resin obtained by hardening at room temperature with 3% isopropylbenzene peroxide and 2% styrene solution of cobalt naphthenate (40%) are: time of gelatination 2.5 hrs, specific gravity 1.21, hardness (Brinell) 20.04 kg/mm^2, thermostability by Vick 121°C, water absorption in 24 hrs 0.05%, chlorine content 18.9%, bending strength limit 600 kg/cm^2, compression strength limit 1,050 kg/cm^2, duration of burning

Difficultly inflammable polyester resins ...

after being in a gas burner flame for 2 minutes 5 seconds. Using glass gauze of the АСТТ-6(С)$_2$ (ASTT-b(S)$_2$) type in a ratio of 1 : 1 with the obtained resin a glassfiber-containing plastics material was manufactured by the contact method (without pressure and heating). Hardening was carried out with isopropylbenzene peroxide and cobalt naphthenate. The following physical and mechanical properties of the obtained plastics were determined: specific gravity 1.68, water absorption in 24 hrs 0.1%, tensile strength limit 2,800 kg/cm^2, bending strength limit 2,450 kg/cm^2, strength limit of compression in direction parallel to the layers 1,350 kg/cm^2, specific resilience 170 kg·cm/cm^2. The experiments concerning the inflammability using the "fire tube" method demonstrated that by adding 1% antimony trioxyde to the plastics material an immediate selfquenching takes place after taking the material from the flame. The loss in weight is 3.3%. Concluding the authors thank D.M. Rudkovskiy and Ye.K. Remiz for their help.

SUBMITTED: September 14, 1960

Card 3/3

AL'SHITS, I.M.; SHTRAYKHMAN, G.A.; RUDKOVSKIY, D.M.; LUCHKO, R.G.; REMIZ, Ye.K.

In combustible polyester resins based on pentaerythritol dichlorohydrin. Khim.prom. no.3:174-176 Mr '61. (MIRA 14:3)
(Propanediol) (Resins, Synthetic)

AL'SHITS, I.M.; SHTRAYKHMAN, G.A.; LUCHKO, R.G.; TSUBINA, Kh.V.

Noninflammable polyester resins based on di- and trichloromethyl derivatives of pentaerythritol. Zhur. prikl. khim. 34 no.2:468-469 F '61. (MIRA 14:2)

(Pentaerythritol)

AL'SHITS, I. M.; GRAD, N. M.; LUCHKO, R. G.; TSUBINA, Kh. V.

Self-quenching unsaturated polyesters based on pentaerythrityl polychlorohydrins. Plast. massy no.11:12-14 '62. (MIRA 16:1)

(Pentaerythritol) (Esters) (Combustion)

selecting parameters of a

TOPIC TAGS: servo system, two channel servo system

ABSTRACT: A method for calculating a

Card 1/2

SUB CODE: IE, DP NO REF SOV: 003 OTHER: 000

Card 2/2

KOVAL', T.; LUCHKO, T.

The state benefits, so does labor. Sov.profsoiuzy 16 no.10: 31-33 My '60. (FIRA 13:6)

1. Nachal'nik otdela organizatsii truda zavoda imeni Stalina (for Koval'). 2. Predsedatel' komissii zarabotnoy platy zavkoma profsoyuza zavoda imeni Stalina (for Luchko).
(Stalino--Steel industry) (Hours of labor)
(Wages)

LUCHKO, V.F., glavnyy vrach kliniki

Il'ia Leont'evich Zaichenko. Ortop., travm. i protez. 18 no.1: 79-80 Ja-F '57. (MLRA 10:6)
(ZAICHENKO, IL'IA LEONT'EVICH, 1896-)

VORONINA, Lidiya Dmitriyevna, doktor tekhn. nauk; BAGRINOVSKIY, Aleksey Dmitriyevich, kand. tekhn. nauk; NIKITIN, Vladimir Sergeyevich, kand. tekhn. nauk; LUCHKO, V.S., red.; SABITOV, A., tekhn. red. IL'INSKAYA,G.M., tekhn.red.

[Design of mine ventilation]Raschet rudnichnoi ventiliatsii. Moskva, Gosgortekhizdat, 1962. 486 p. (MIRA 16:1)
(Mine ventilation)

VASIL'YEV, M.V.; LUCHKO, Yu.V., red.; TAMKOVA, N.F., tekhn.red.

[Scientific principles for planning and operating truck transportation in open-pit mines] Nauchnye osnovy proektirovaniia i ekspluatatsii avtomobil'nogo transporta na otkrytykh gornykh razrabotkakh Sverdlovsk, 1962. 332 p. (Akademiia nauk SSSR. Ural'skii filial. Institut gornogo dela. Trudy, no.1). (MIRA 16:3)
(Mine haulage)

LUCHKO-KHARINA, T.M., assistent (Khar'kov)

Clinical aspects of the interparoxysmal period of theumatic fever in adults. Kaz. med. zhur. no.1:66-67 Ja-F'63.
(MIRA 16:8)

(RHEUMATIC FEVER)

DOLGOSHEIN, B.A.; LUCHKOV, B.I.; USHAKOV, V.I.

Operation of gas-discharge counters at large pulse overvoltages. Nek.vop.eksp.fiz. no.2:32-39 '59. (MIRA 13:2)

(Nuclear counters)

DOLGOSHEIN, B.A.; LUCHKOV, B.I.

Polarization of streams of μ^+-mesons at sea level. Nek.vop. eksp.fiz. no.2:92-95 '59. (MIRA 13:2)
(Mesons)

21(1) SOV/56-36-2-56/63

AUTHORS: Dolgoshein, B. A., Luchkov, B. I.

TITLE: The Polarization of the Flux of μ^+-Mesons at Sea Level (Polyarizatsiya potoka μ^+-mezonov na urovne morya)

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1959, Vol 36, Nr 2, pp 640-641 (USSR)

ABSTRACT: This paper deals with the experimental determination of the polarization degree of cosmic positive muons at sea level. For this purpose, the authors measured the relative share of the decay positrons which in the decay of a stopped positive meson fly away into the upper hemisphere. The $\mu \rightarrow e$ decays were investigated in a great rectangular cloud chamber which contains 9 copper plates of 4 mm thickness. The muons entered the chamber with a momentum of $p_\mu \gtrsim 1.2$ Bev/c. The authors observed 202 muon decays 122 of which flew away into the upper hemisphere, and 80 - into the lower one. This ratio corresponds to the polarization degree $\eta = 0.98 \begin{smallmatrix}+0.02\\-0.32\end{smallmatrix}$. Control experiments proved that there are no great experimental errors. Theoretical calculations give

Card 1/3

The Polarization of the Flux of μ^+-Mesons at Sea Level

the value $\eta = 0.3$ for the polarization degree of the muons produced by pions. The experimental result, therefore, does not agree with the theoretically calculated value. Moreover, it is contradictory to the experimental results obtained by G. W. Clark (Klark) and J. Hersil (Gersil), i.e. $\eta = 0.19 \pm 0.06$. This contradiction can be the result of a statistical fluctuation the probability of which amounts to ~1%. If further investigations confirm the results of the experiment discussed in this paper, the cause of this contradiction can be sought for the case that the mesons (within the momentum interval investigated in the present paper) are produced in the atmosphere not only by $\pi \rightarrow \mu$ decays. The authors investigated the polarization of muons which have momenta $\gtrsim 1.2$ Bev/c at seal level. Muons of such momenta preferably are produced in an altitude of some kilometers, and in the instant of production they have a momentum of 4 + 5 Bev/c. The $K_{\mu 2}$-decay can play an essential role in the production of muons of such momenta. For a sufficient accord with the experimental data, it is sufficient to assume that the number of the K-mesons amounts to 20% of the number of the pions. This conclusion can be drawn for energies of ~ 10 Bev. Thus, by investigating

The Polarization of the Flux of μ^+-Mesons at Sea Level

the dependence of the polarization degree on the energy of the muons, information concerning the production mechanism of high-energy muons can be found. The authors thank Professor A. I. Alikhanyan for his constant interest and for useful advice. There are 4 references, 1 of which are Soviet.

ASSOCIATION: Moskovskiy inzhenerno-fizicheskiy institut
(Moscow Engineering-Physics Institute)

SUBMITTED: July 31, 1958

Card 3/3

69074

S/120/60/000/01/009/051
E192/E382

21.5300

AUTHORS: Dolgoshein, B.A., Luchkov, B.I. and Ushakov, V.I.

TITLE: Operation of Gas-discharge Counters at Large Pulsed Overvoltages 19

PERIODICAL: Pribory i tekhnika eksperimenta, 1960, Nr 1, pp 39 - 42 (USSR)

ABSTRACT: The experimental equipment used in the investigation described was as follows: a set of two G-M counters connected to a coincidence circuit were used to register cosmic particles. The resulting coincidence pulse operated a generator producing a supply pulse having a duration of 0.3 - 4.5 μs and an amplitude up to 3 kV. The supply pulse was applied to the investigated counter which was situated between the two "coincidence" counters. The pulse generator was based on the circuit described in Ref 1 and also on a hydrogen-thyratron furnished with a forming line. The delay between the supply pulse and the instant of appearance of a particle could be varied from 0.7 to 50 μs. The load of the counter was 30 kΩ. When the pulse duration was 0.3 μs, the pulse was triangular and had a rise time of 0.1 μs

Card1/4

4

Operation of Gas-discharge Counters at Large Pulsed Overvoltages

and a decay of 0.2 μs. At longer durations the shape of the pulse could be regarded as being rectangular, its rise time being 0.1 μs. The above equipment was used to investigate the properties of the counters, types MS-9, GS-9 and GS-30. Figure 1 shows the amplitude characteristics of the counters, type MS-9 and the relative number of spurious discharges for a constant supply voltage which was 100 V higher than the Geiger threshold. Curve 1 in the figure represents the amplitude characteristic, while Curves 2 show the number of spurious discharges. It was found that the amplitude characteristics of the counters, types GS-9 and GS-30, are very similar to those of Figure 1, provided the test conditions are identical. The efficiency of a counter depends substantially on the delay of the supply pulse with respect to the appearance of the particle. The time during which the counter "remembers" the passage of a particle depends on the number of charges produced in the volume of the counter and the rate of their extraction. This effect

Operation of Gas-discharge Counters at Large Pulsed Overvoltages

is illustrated, for the counter type MS-9, in Figure 2. From this it is seen that the "memory" of the counter is about 5-6 μs. The efficiency as a function of the supply voltage is plotted in Figure 3. From this it is seen that at a fixed delay time (6 μs) the efficiency curve has a minimum. This can be explained as follows: The time determining the "memory" of the counter in the Geiger region consists of two components: the time necessary for the propagation of the charge along the wire and the time during which the positive ions recede from the wire sufficiently far for the probability of the ionisation by ions to be sufficiently small. Figure 4 shows the time characteristics of the counters MS-9 when the particles were passing through the middle of the counter (Curves 1 and 3) and through the end of the counter (Curves 2 and 4). It is seen that the "memory" times for the two cases are different. This permits evaluation of the velocity of the propagation of the discharge in the counter. It is found that the velocity is 2 cm/μs. The time characteristics for

 the counters type GS-30 are shown in Figure 5. From this,

Operation of Gas-discharge Counters at Large Pulsed Overvoltages

it is seen that the "memory" time for the counters is 3-4 μs. The time characteristics of the GS-9 counters are similar to those of Figure 5. The counters type MS-9 were also investigated at low DC voltages. The meaning of the term "low" signifies that the counters operated in the absence of gas-type amplification. The time characteristics for the counter taken with the pulse voltage of 1.9 kV are given in Figure 6. The authors make acknowledgment to A.A. Tyapkin and V.V. Vishnyakov for valuable advice. There are 6 figures and 2 Soviet references.

SUBMITTED: January 14, 1959

Card 4/4

S/058/61/000/010/024/100
A001/A101

AUTHORS: Dolgoshein, B.A., Luchkov, B.I., Ushakov, V.I., Asatiani, T.L., Krishchan, V., Matevosyan, Ye., Sharkhatunyan, R.

TITLE: On polarization of μ-mesons of cosmic radiation

PERIODICAL: Referativnyy zhurnal. Fizika, no. 10, 1961, 97-98, abstract 10B516 ("Tr. Mezhdunar. konferentsii po kosmich. lucham, 1959, v. 1", Moscow, AN SSSR, 1960, 319 - 321)

TEXT: Polarization of μ-mesons was determined from asymmetry of angular distribution of positrons at stops and decays of μ-mesons in copper. The μ-mesons with momenta of 0.35; 1.05; 1.5, and 2.0 Bev/c were measured. The respective values of polarization are as follows: 0.21±0.08; 0.35±0.087; 0.52±±0.083 and 0.50±0.09. The relation obtained between the polarization degree of μ-mesons and their momenta is briefly discussed.

L. Dorman

[Abstracter's note: Complete translation]

Card 1/1

S/120/62/000/001/009/061
E032/E514

AUTHORS: Borisov, A.A., Dolgoshein, B.A., Luchkov, B.I., Reshetin, L.V. and Ushakov, V.I.

TITLE: A study of spark-chamber characteristics

PERIODICAL: Pribory i tekhnika eksperimenta, no.1, 1962, 49-54

TEXT: The authors report the construction and the main characteristics of an experimental argon-filled spark chamber with a working volume of 0.5 litres. The spark chamber consists of four plane-parallel electrodes (150 x 70 x 5 mm^3) separated by cylindrical teflon insulators. Gap lengths of 8, 10, 12 and 30 mm have been used (in the latter case there is only one gap). The chamber is filled with technical argon mixed with a small amount of ethyl alochol to reduce spurious discharges. The chamber is gated by two arrays of Geiger counters, one above and one below the chamber. The coincidence pulse from these two arrays triggers a high-voltage pulse generator based on the hydrogen thyratron ТГИ-1 (TGI-1) 325/16. The pulse produced by the generator has a rise time of about 30 nanosec and a decay constant of 10^{-7} sec; the amplitude is approximately equal to the

Card 1/2

maximum anode voltage on the thyratron. The delay between the passage of the nuclear particle and the application of the high-voltage pulse to the electrodes is about 0.7 μsec, most of which is associated with the operation of the hydrogen thyratron. A clearing field of up to 100 V/cm is applied to the plates. Fig.3 shows the dependence of the efficiency of the chamber on the amplitude of the high-voltage pulse for various gas pressures (zero clearing field, high-voltage pulse delay 0.7 μsec, inter-electrode gap 10 mm). Data are also reported on the dependence of the efficiency on the high-voltage decay time, the amplitude and polarity of the clearing field and the high-voltage delay time. It is reported that particle tracks at angles up to 35° with the normal to the plates can be reliably recorded. There are 6 figures.

ASSOCIATION: Fizicheskiy institut AN SSSR
(Physics Institute AS USSR)

SUBMITTED: February 16, 1961

S/120/62/000/001/018/061
E140/E463

AUTHORS: Dolgoshein, B.A., Luchkov, B.I., Ushakov, V.I.

TITLE: Pulse hodoscope for muon decay investigations

PERIODICAL: Pribory i tekhnika eksperimenta, no.1, 1962, 85-89

TEXT: The instrument described here is intended for the study of the polarization of cosmic μ^+ mesons, by recording the particle trajectories in $\mu \rightarrow e$ decay. The method is to determine the ratio of decay positrons emerging from an absorber in the forward and backward hemispheres. Gas counters are used with pulsed overvoltage. This permits defining the times at which neon-triode indicator tubes operate in the cycle of events associated with the decay. The arrangement is best illustrated with reference to Fig.1. Here rows A_1, A_2 and A_3 consist of argon-methylal counters specially produced in the laboratory (diameter 2 cm, length of sensitive volume 60 cm), the remaining rows consisting of standard Soviet geiger counters type СИ-6Г (SI-6G). Row П is the absorber, dimensions 70 x 140 x 2 cm^3. Blocks B and C are intended for positron trajectory measurements, and are as symmetrical as possible. In addition,

Card 1/3

Pulse hodoscope for muon decay ...

they are attached to a mechanism permitting their rapid interchange (every two hours). The dc excitation of the counters in the hodoscopic rows A_1, A_2, A_3 and the B, C blocks was selected to enable an arc discharge to arise after passage of an ionizing particle by application of very short ($\sim$0.1 μs) pulse over-voltages, with an efficiency of $\sim$100%. By terminating the pulse excitation of the hodoscope tubes before applying that of the positron detection blocks B, C, the hodoscope tubes are not permitted to register the passage of positrons occurring during the time that B and C are excited. The pulse excitation of the hodoscope rows is triggered by a muon passage, while the positron blocks are triggered from 0.8 to 5.8 μs later. Rows S_1, S_2, S_3 are control rows, used for detecting the arrest of a muon in the absorber. The relationship between the dc and pulse excitation voltages in B, C, is such that the efficiency for charged particles passing through the counters during the pulse excitation is close to 100%, while very low ($\lesssim 10^{-7}$) for the passage of the muon which triggers the pulse supply. A block diagram and the counter-indicator circuits are given and discussed in some detail.
Card 2/5

S/120/62/000/001/018/061
Pulse hodoscope for muon decay ... E140/E463

An example of the records obtained is given. The photograph (Fig.3) indicates the arrival of a μ^+, its absorption in Fe, and the emission of a positron during the interval 1.7 to 2.2 μs. A time analyser associated with the hodoscopic instrument permits the muon lifetime to be determined, acting as a control on the hodoscope, and permits possible depolarization during the 5 μs after arrest, giving the dependence of polarization on time. A series of control measurements was made to determine the asymmetry of the instrument with respect to the absorber. Iron was used to obtain full depolarization. Using 30 μs delay, or operating without an absorber, the background (false $\mu \rightarrow e$ decay) was measured and found to be about 5×10^{-3}. The muon lifetime was found to be 2.19 ± 0.04 μs, from measurements on the instrument. There are 3 figures.

ASSOCIATION: Fizicheskiy institut AN SSSR
(Physics Institute AS USSR)

SUBMITTED: April 18, 1961

Card 3/5

37809

S/120/62/000/002/040/047
E032/E514

9.6.160

AUTHORS: Borisov, A.A., Dolgoshein, B.A. and Luchkov, B.I.

TITLE: A spark counter with a large interelectrode gap

PERIODICAL: Pribory i tekhnika eksperimenta, no.2, 1962, 170

TEXT: The dimensions of the counter are 40 x 30 x 10 cm^3 and the distance between the electrodes is 4.5 and 10 cm. It consists of a rectangular perspex frame and two dural electrodes on either side of the frame. The working gases are argon and neon (purity better than 0.1%), and ethyl alcohol and methylal are used as quenchers. The efficiency of the counter was found to remain at 100% for ten days without re-filling. In view of the simplicity of the counter, large area counters of this type (1-2 m^2) may be feasible and may find application in cosmic-ray experiments. There is 1 figure.

ASSOCIATION: Fizicheskiy institut AN SSSR (Physics Institute, AS USSR)

SUBMITTED: July 11, 1961

Card 1/1

24.6610

S/048/62/026/006/002/020
B125/B112

AUTHORS: Dolgoshein, B. A., Luchkov, B. I., and Ushakov, V. I.

TITLE: Polarization of cosmic muons of different energies

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Seriya fizicheskaya, v. 26, no. 6, 1962, 711 - 712

TEXT: Polarization measurement in the energy range 0.2 - 1.55 Bev is studied. A preliminary report has already been given at the Mezhdunarodnaya konferentsiya po kosmicheskim lucham (International Conference on Cosmic Rays) Moscow, 1959. The degree of polarization was determined from the decay asymmetry when a muon was slowed down in a copper target surrounded by an array of Geiger counters (in rectangular or cylindrical arrangement). The background is practically eliminated by photographic fixing of the muon and positron trajectories for each single $\mu^+ \rightarrow e^+$ -decay. In this way cases can easily be identified. Measurement of the decay positrons with the rectangular experimental arrangement permits an additional control and confirms that the muon is not depolarized after slowing down in the target. The check measurements on an

Card 1/2

S/048/62/026/006/002/020
B125/B112

Polarization of cosmic muons...

iron target confirm the symmetry of the rectangular experimental arrangement. At sea level, photographic pictures of approximately 40,000 $\mu \rightarrow e$-decay events were taken at muon energies 0.2; 0.3; 0.55; 1.05; 1.4 and 1.55 Bev. From these data the degree of polarization was calculated with the aid of the "Ural" computer. If the muon energy increases from (0.2 ÷ 0.5) to (1.4 ÷ 1.55) Bev, polarization increases (1.5 ± 0.19) times and approximately agrees with the theoretical values of V. Berezinskiy, B. Dolgoshein, Zh. eksperim. i teor. fiz., 42, 949 (1962). There are 1 figure and 1 table. The most important English-language reference is: G. Clark, J. Hersil, Phys. Rev., 108, 1938 (1957).

Card 2/2

3.2400
24.6700

37098
S/056/62/042/004/004/037
B102/B104

AUTHORS: Dolgoshein, B., Luchkov, B., Ushakov, V.

TITLE: Low-energy cosmic muon polarization at sea level

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 42, no. 4, 1962, 949-955

TEXT: The polarization of cosmic positive muons of 0.2-1.55 Bev was measured at sea level with a copper absorber ($700 \cdot 1400 \cdot 20$ mm^3) surrounded by several layers of gas-discharge counters. The μ^--mesons decayed before recording (lifetime $\sim 10^{-7}$ sec). The background of the μ^+-e^+ decays recorded could be due to rather improbable events (the muon is stopped in the layers and another particle passes through the positron detector; the muon and positron trajectories intersect within the absorber; the muons are stopped or decay in the glass walls of the counters nearest to the absorber plate). The ratio between background and effect was of the order of 10^{-2}-10^{-3}. During 1500 hrs operation more than $3 \cdot 10^4$ μ^+-e^+ events were recorded. From the time distribution of the decay positrons the μ^+

Card 1/3

Low-energy cosmic muon polarization ...

lifetime was obtained as 2.18 ± 0.04 μsec. The asymmetry of the positron angular distribution was measured, the asymmetry factors R were determined:

Absorber	Cu	Cu	Cu	Fe
E, Bev	0.2	0.55	1.40	0.55
R	1.13 ± 0.025	1.135 ± 0.020	1.195 ± 0.030	1.020 ± 0.023

The polarization of the muon flux was calculated from R, taking account of the geometry, the angular and energy distributions and the range-energy ratio of the decay positrons. The numerical results are given in Table 2; for Fe polarization was, as expected, equal to zero. The possible contribution of $K_{\mu 2}$ decays to the polarization is estimated: $\eta(E_\mu \approx 1.5$ Bev) = 0.375 ± 0.035. From this a value $K^+/\pi^+ = 0.22 \pm 0.18$ is obtained for the ratio of K^+ and π^+ mesons produced in the atmosphere. Professor A. I. Alikhanyan is thanked for interest and V. Berezinskiy for discussions. There are 5 figures and 2 tables.

ASSOCIATION: Moskovskiy inzhenerno-fizicheskiy institut (Moscow Engineering Physics Institute)

SUBMITTED: November 1, 1961

Card 2/3

Low-energy cosmic muon polarization ...

S/056/62/042/004/004/037
B102/B104

E_{μ^+}, Bev	Number of decays	Polarization exp.	Polarization theor.
0,20	6663	0,24±0,045	0,23
0,30	1415	0,29±0,08	0,25
0,55	11066	0,25±0,035	0,28
1,05	1485	0,40±0,08	0,33
1,40	5701	0,35±0,05	0,335
1,55	4900	0,40±0,05	0,335

Table 2

Card 3/3

S/823/62/000/000/004/007
B125/B102

AUTHORS: Dolgoshein, B. A., Luchkov, B. I., Ushakov, V. I.

TITLE: Study of the polarization of positive muons in cosmic rays

SOURCE: Nekotoryye voprosy fiziki elementarnykh chastits i atomnogo yadra. Ed. by V. D. Mikhaylov and I. L. Rozental'. Mosk. inzh.-fiz. inst. Moscow, Gosatomizdat, 1962, 83-90

TEXT: The polarization of a current of high-energy muons was studied with a view to elucidating how they are produced in the upper atmosphere. Their degree of polarization is most conveniently determined by measuring the angular distribution of decay positrons from a muon stopped inside a cylindrical target. The experimental arrangement is shown in Fig. 1. 7798 $\mu \rightarrow e^+$ decays were recorded within 5200 hrs at muon energies of 0.3, 1.05, and 1.55 Bev, and for each case the positron angular distributions were measured. Using the method of least squares, the quantity $b\eta$ in the equation $f(\theta) \sim 1 - b\eta \cos\theta$ (θ = projection of the angle between positron direction and muon direction onto the perpendicular plane) is calculated from these angular distributions. The factor b depends on the parameters of

Card 1/3

Study of the polarization of...

the experimental arrangement and on the characteristics of the $\mu^+ \rightarrow e^+$ decay (positron spectrum, range-to-energy ratio of the positrons). At the instant of muon production, their polarization is given by $\eta^* = \eta/K_{atm}K_{stop}$, where η is the degree of polarization, and $K_{atm} \sim 0.95$ is the coefficient of depolarization in the atmosphere; the coefficient K_{stop} allows for the possible depolarization of the muon after stopping. Accelerator experiments indicated that $K_{stop} = 1$. For 0.3 Bev, $\eta^* = 0.30 \pm 0.08$ and $\eta' = 0.24$; for 1.05 Bev, $\eta^* = 0.40 \pm 0.08$ and $\eta' = 0.33$; for 1.55 Bev, $\eta^* = 0.40 \pm 0.05$ and $\eta' = 0.335$. η' is the degree of polarization to be expected from data of V. Berezinskiy and B. A. Dolgoshein (Zh. eksperim. i teor. fiz. 71, 42, 1084 (1962)). The difference between η^* and η' is obviously due to the effect of $K \rightarrow \mu$ decay on the production of muons at increasing energy. The resulting degree of polarization may be considerably affected even by very small amounts of muons produced in $K \rightarrow \mu$ events. The great significance of measuring the polarization of cosmic-ray muons at even higher energies is stressed. There are 4 figures and 1 table.

Card 2/3

S/120/62/000/005/031/036
E194/E535

AUTHORS: Babalov, M.A., Dolgoshein, B.A., Luchkov, B.I. and Sosnin, F.R.

TITLE: A study of the sensitivity of photographic emulsion in high electric fields

PERIODICAL: Pribory i tekhnika eksperimenta, no.5, 1962, 178-179

TEXT: Attempts were made to repeat the result of Rothstein (Photogr. Sci. Engng, 1959, 3, 255; 1960, 4,5) who observed a great increase in the sensitivity of photographic emulsions in electric fields of 1 - 2 MV/cm. The effect was not observed either in tests with a standard photographic emulsion (25 μ thick) with a speed of 100 GOST units illuminated by light pulses of 30 μsec applying simultaneously electric stresses up to 800 kV/cm, or in further tests with high speed (1400 GOST units) aerial photography film 30 μ thick on a base 120 μ thick made under a pressure of 25 atm (to reduce the possibility of breakdown) to which impulses of 110 kV were applied. The expected effect may have been absent due to the very short electron free path in the emulsions used, which were chemically sensitized. There was a small but rather

Card 1/2

A study of the sensitivity of ... S/120/62/000/005/031/036
E194/E535

irreproducible reduction in sensitivity at stresses of 30-40 kV/150 μ. There is 1 figure.

ASSOCIATION: Fizicheskiy institut AN SSSR (Physics Institute AS USSR)

SUBMITTED: October 10, 1961

Card 2/2

BORISOV, A.A.; DOLGOSHEIN, B.A.; LUCHKOV, B.I.; RESHETIN, L.V.; USHAKOV, V.I.

Investigating the characteristics of a spark chamber. Prib. i tekh. eksp. 7 no.1:49-54 Ja-F '62. (MIRA 15:3)

1. Fizicheskiy institut AN SSSR.
(Cloud chamber--Testing)

DOLOGOSHEIN, B.A.; LUCHKOV, B.I.; USHAKOV, V.I.

Pulse hodoscope for studying the decay of muon. Prob.i tekh.eksp. 7 no.1:85-89 Ja-F '62. (MIRA 15:3)

1. Fizicheskiy institut AN SSSR.
(Nuclear counters)(Cosmic rays)

BORISOV, A.A.; DOLGOSHEIN, B.A.; LUCHKOV, B.I.

Spark counter with a large interelectrode interval. Prib. i tekh. eksp. 7 no.2:170 Mr-Ap '62. (MIRA 15:5)

1. Fizicheskiy institut AN SSSR.
(Nuclear counters)

DOLGOSHEIN, B.A.; LUCHKOV, B.I.; USHAKOV, V.I.

Polarization of cosmic muons at different energy levels. Izv. AN SSSR. Ser. fiz. 26 no.6:711-712 Je '62. (MIRA 15:6)
(Mesons) (Cosmic rays)

DOLGOSHEIN, B.; LUCHKOV, B.; USHAKOV, V.

Polarization of low energy cosmic ray muons at sea level. Zhur.-eksp.i teor.fiz. 42 no.4:949-955 Ap '62. (MIRA 15:11)

1. Moskovskiy inzhenerno-fizicheskiy institut.
(Mesons) (Cosmic rays)

[illegible] V. N.; DAYON, M. I.; DEVISHEV, M. I.; DOLOGOSHEYN, B.A.; KLIMANOVA, L. F.; [illegible] B. I.; SHMELEVA, A. P.

New Discharge Track-Detector Chamber Investigation of Characteristics of some Spark Chambers.

Report submitted for the Intl. Conf. on Cosmic Rays (IUPAP), Jaipur India, 2-14 Dec 1963.

APPROVED FOR RELEASE: 04/03/2001 CIA-RDP86-00513R001030710019-9"

ACCESSION NR: AP4012569 S/0056/64/046/001/0392/0395

AUTHORS: Dolgoshein, B. A.; Luchkov, B. I.

TITLE: New gas discharge tracking detector -- streamer chamber

SOURCE: Zhurnal eksper. i teoret. fiz., v. 46, no. 1, 1964, 392-395

TOPIC TAGS: gas discharge detector, gas discharge particle detector, particle detector, spark chamber, streamer chamber, incomplete spark discharge, electron avalanche, cosmic ray tracking, chamber dead time, ionization density measurement, spark discharge

ABSTRACT: The essential feature of the new chamber is the use of an incomplete spark discharge. The point of passage of the particle is indicated not by a spark but by a streamer, or more exactly by the initial portions of all the streamers which form the electron avalanches along the particle path. The gas discharge is stopped artificially at the stage when the avalanches grow into streamers and the

Card 1/2

ACCESSION NR: AP4012569

latter begin to travel to the electrodes at $\approx 10^8$ cm/sec. Radiation of the gas in the streamer plasma makes the track visible. The construction and supply circuits are described, and photographs of cosmic-ray tracks obtained with the chamber are presented. The dead time of the streamer chamber should be much shorter than that of the spark chamber, because of the lower charge density in the plasma of the former. The streamer chamber is also more effective in measurements of particle ionization density and in the study of initial stages of a spark discharge. "The authors thank Prof. A. I. Alikhanyan for his continuous interest in the work, V. V. Dmitrenko and V. V. Chizhov of the MIFI Problems Laboratory, and L. V. Sukhov of FIAN for help." Orig. art. has: 2 figures.

ASSOCIATION: Fizicheskiy institut im. P. N. Lebedeva AN SSSR (Physics Institute, AN SSSR)

SUBMITTED: 04Nov63 DATE ACQ: 26Feb64 ENCL: 01

SUB CODE: PH, SD NO REF SOV: 006 OTHER: 004

Card 2/3 2

ACCESSION NR: AP4033107 S/0120/64/000/002/0057/0061

AUTHOR: Bolotov, V. N.; Dayon, M. I.; Devishev, M. I.; Klimanova, L. F.; Luchkov, B. I.; Shmeleva, A. P.

TITLE: Accuracy of tracing the particle trajectory by a spark in a spark chamber

SOURCE: Pribory* i tekhnika eksperimenta, no. 2, 1964, 57-61

TOPIC TAGS: spark chamber, large gap spark chamber, cosmic ray study, particle trajectory

ABSTRACT: A qualitative investigation of the shift (translation) and angle between the spark and particle paths in a 20-cm gap spark chamber is reported. Two Ne-filled at 650 torr test chambers had a common electrode with a 50-micron-thick aluminum foil in the center. Min delay was 0.6 microsec. Tracks of mu-mesons of cosmic rays were photographed. Measurements were

Card 1/2

ACCESSION NR: AP4033107

performed with a parallel (130 kv) and series (65 kv) connection of the chambers with the supply surge generator. The spark thickness was 1-2 mm. It was proved that high-energy (500-600 Gev/s) particles can be measured by the "spark chamber, magnetic field" method at existing cosmic-ray stations. "The authors consider it their duty to express their gratitude to B. A. Dolgoshein for his useful comments, to P. N. Komolov, L. L. Sabsovich, and E. Chaykovskaya for their help in computer data processing, to V. A. Nikolayev, I. N. Solodnikov, and V. Lukin for their help in aligning and operating the spark chambers, and to N. V. Fedulova for her help in processing the results." Orig. art. has: 5 figures and 9 formulas.

ASSOCIATION: Fizicheskiy institut im. P. N. Lebedeva AN SSSR (Institute of Physics, AN SSSR)

SUBMITTED: 24Apr63 DATE ACQ: 11May64 ENCL: 00

SUB CODE: PH NO REF SOV: 004 OTHER: 004

Card 2/2

[illegible]

[illegible]

[illegible]

SOURCE: Pribory* i tekhnika eksper[illegible]

TOPIC TAGS: spark discharge chamber

ABSTRACT: The accuracy of spark tra[illegible]

[illegible]

[illegible]

Card 1/2

regime, was used for measuring the false curvature of tracks. "The authors wish to thank A. I. Alikhanyan for his interest in the work." Orig. art. has:

Card 2/2

ACCESSION NR: AP4042551 S/0056/64/046/006/1953/1959

AUTHORS: Dolgoshein, B. A.; Luchkov, B. I.; Rodionov, B. U.

TITLE: Streamer chamber

SOURCE: Zh. eksper. i teor. fiz., v. 46, no. 6, 1964, 1953-1959

TOPIC TAGS: particle counter, particle detector, spark discharge chamber, charged particle trajectory, cosmic ray measurement

ABSTRACT: The authors describe in detail the construction and mechanism of operation of a new type of gas discharge track chamber, the development of which was stimulated by the unsatisfactory operation of the commonly used multilayer spark or discharge chamber. The new streamer chamber possesses all the advantages of a spark chamber (rapid action, simplicity of construction and of auxiliary high-voltage techniques, possibility of constructing chambers of large dimensions, etc.) and at the same time records with good resolution the

Card 1/4

ACCESSION NR: AP4042551

spatial picture of any event occurring in the chamber volume, and presents a picture of the charged particles in the chamber irrespective of their direction of motion. A detailed description of the chamber design and the auxiliary equipment is given elsewhere (PTE, in press). The mechanism of formation of the particle tracks is discussed and results of experimental investigations of various characteristics of the chamber are presented. The effect of different gas media and gas pressures was also studied. The results show that the brightness and structure of the track depend on the direction of particle trajectory relative to the electric field in the chamber. Furthermore, particle tracks in the chamber are not very bright and are rather wide in the electric-field direction, which impairs the spatial resolution. The advantages of the streamer chamber over the spark chamber are evident in such important parameters as dead time and the possibility of measuring the ionizing ability of the particles. The streamer chamber can also be very useful for the study of processes related to the physics of gas discharge such as streamer velocity, electron shower

Card 2/4

ACCESSION NR: AP4042551

path length, fluctuations in showers, and other discharge characteristics, since the primary electrons that initiate the discharge are accurately localized in the region between electrodes. "The authors thank Professor A. I. Alikhanyan for his interest in the work, Yu. Grashin, S. Somov, V. Chuvilo, and V. Dmitrenko of MIFI, and L. V. Sukhov of FIAN for great help in the work, and also V. Ry*kalin of LYaP OIYaI for supplying the photographic film. Orig. art. has: 6 figures.

ASSOCIATION: Fizicheskiy institut im. P. N. Lebedeva Akademii nauk SSSR (Physics Institute, Academy of Sciences SSSR)

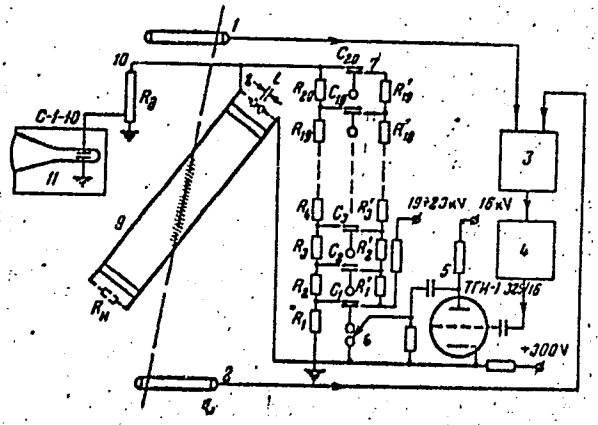
SUBMITTED: 10Dec63 DATE ACQ: ENCL: 01

SUB CODE: NP NR REF SOV: 009 OTHER: 007

Card 3/4

ACCESSION NR: AP4042551

ENCLOSURE: 01



Block diagram of experimental setup:
1, 2 - rows of GM counters
3 - coincidence circuit
4 - amplifier and discriminator
5 - generator
6 - first firing gap of pulse generator
7 - pulse generator
8 - shunting discharge gap
9 - chamber
10 - high-voltage divider
11 - oscilloscope

Card 4/4

DOLGOSHEIN, B.A.; LUCHKOV, B.I.; RODIONOV, B.N.

Streamer chamber. Zhur.eksp.i teor.fiz. 46 no.6:1953-1959 Je '64.

1. Fizicheskiy institut imen P.N. Lebedeva AN SSSR.
(MIRA 17:10)

L 4489-66 EWT(m)/FCC/T IJP(c)

ACC NR: AP5024660 SOURCE CODE: UR/0048/65/029/009/1777/1780

AUTHOR: Bolotov, V.N.; Devishev, M.I.; Klimanova, L.F.; Luchkov, B.I.; Shmeleva, A.P.

ORG: none

TITLE: Some characteristics of wide gap spark chambers and applications of such chambers in cosmic ray physics /Report, All-Union Conference on Cosmic Ray Physics held at Apatity 24-31 August 1964/

SOURCE: AN SSSR. Izvestiya. Seriya fizicheskaya, v. 29, no. 9, 1965, 1777-1780

TOPIC TAGS: spark chamber, particle detector, particle track, cosmic ray particle

ABSTRACT: Recent literature on the characteristics of wide gap spark chambers is briefly reviewed from the point of view of the applicability of such chambers to problems of cosmic ray physics. The "streamer chamber" of B.A.Dolgoshein, B.I.Luchkov, and B.U.Rodionov (Zh. eksperim. i teor. fiz., 46, 1953 (1964); Doklad na konferentsii po fizike vysokikh energiy, Dubna, 1964) is also discussed briefly. The root-mean-square angle between the two tracks of the same particle successively traversing two chambers with 20 cm gaps in a direction making an angle of less than 8° with the electric field was found to be 5×10^{-4} radian. With this small angular dispersion it would be possible to measure momenta up to 550 BeV/c with the aid of a 150 cm long 10 kOe magnetic field. This angular dispersion can be decreased by improving the uniformity of the electric field and the purity of the gas, and by reducing the delay be-

Card 1/2

L 4489-66

ACC NR: AP5024660

tween passage of the particle and application of the field. The direction of the spark agrees with that of the track within 1° even when the angle between the track and the electric field is as large as 40-50°. The shower efficiency of a spark chamber with a 10 cm gap has been found to be 100 % for showers of up to 200 particle tracks making angles less than 20° with the electric field, and under certain conditions it is possible to distinguish tracks of heavily ionizing particles against a background of minimum ionizing particle tracks. It is possible to increase the delay between particle passage and field application up to 20 microsec without reducing the recording efficiency for single particles below 100 %, but the quality of the track deteriorates when the delay exceeds 2 microsec. In the streamer chamber the duration of the high voltage pulse is nicely controlled so that streamer development begins but the spark discharge stage is not reached. It is thus possible to record narrow tracks for particles moving in an arbitrary direction with respect to the electric field. The streamer chamber appears to be the best of all track chambers for accurate determinations of track directions and curvatures. Orig. art. has: 5 figures.

SUB CODE: NP/ SUBM DATE: 00/ ORIG REF: 008/ OTH REF: 007

Card 2/2

LUCHKOV, P.G., aspirant

Morphological and physiological analysis of the double-cross corn hybrids VIR-42 and VIR-25 in the foothill zone of the Kabardino Balkar A.S.S.R. Uch. zap. Kab.-Balk. gos. un. no.10:5-21 '61. (MIRA 17:6)

1. Moskovskiy gosudarstvennyy universitet.

LUCHKOV, P.G., aspirant

Effect of the duration of the stages of organogenesis and different times of planting on the variability of the double interlinear corn hybrids VIR-42, VIR-25 and their components in the piedmont zone of the Kabardino-Balkar A.S.S.R. Uch. zap. Kab.-Balk. gos. un. no.12:17-19 '62. (MIRA 16:6)

1. Moskovskiy gosudarstvennyy universitet.
(Kabardino-Balkar A.S.S.R.—Hybrid corn)

LUCHKOV, S.; GUSEVA, N., red.; NAGIBIN, P., tekhn. red.

[We have reached 79 and 16] Imeem 79 i 16. Alma-Ata, Kazsel'khozgiz, 1962. 26 nos. in 1 v. 10 p. (MIRA 17:1)

1. Glavnyy zootekhnik Dzhambulskogo sveklosovkhoza, Kazakh. SSR (for Luchkov).

ACCESSION NR: AR4022432 S/0058/64/000/001/A027/A027

SOURCE: RZh. Fizika, Abs. 1A258

AUTHOR: Gol'bek, G. R.; Luchkov, V. I.

TITLE: Transistorized 20-channel pulse-height analyzer

CITED SOURCE: Tr. 5-y Nauchno-tekhn. konferentsii po yadern. radioelektronike. T. 2. Ch. 1. M., Gosatomizdat, 1963, 135-143

TOPIC TAGS: pulse height analyzer, transistorized pulse height analyzer, 20 channel analyzer, Gamma ray spectrum, scintillation pickup, threshold discriminator, coincidence circuit

TRANSLATION: A 20-channel pulse-height analyzer is described, intended for the investigation of the spectrum of gamma radiation registered by a scintillation pickup. All the main elements of the analyzer are made of transistors and semiconductor diodes. The

Card 1/2

ACCESSION NR: AR4022432

pulses are sorted by channels by a usual system of threshold discriminators and coincidence circuits. The analyzer is built in the form of a table-top unit. On its front panel are located 20 electromechanical counters equipped with a common manual resetting device. The instrument is fed from a 12-volt storage battery or from the AC line. The drain from a storage battery is 30 VA. L. I.

DATE ACQ: 03Mar64 SUB CODE: PH ENCL: 00

Card 2/2

GLIVENKO, Ye.V.; KOROL'KOVA, T.A.; KUZNETSOVA, G.D.; LUCHKOVA, T.I.; TRUBNIKOVA, R.S.

Physiological evaluation of the averaging method for the derivation of biopotentials. Fiziol. zhur. 51 no.8:943-951 Ag '65. (MIRA 18:7)

1. Institut vysshey nervnoy deyatel'nosti i neyrofiziologii AN SSSR i Institut elektronnykh upravlyayushchikh mashin, Moskva.

ZHILYAKOVA, A.Ya.; LUCHKOVSKIY, I.Ya.; KHAZANOVSKIY, I.S.

Design of a precast reinforced concrete element for dump cars. Biul. stroi. tekh. 20 no.10:45-0 '63. (MIRA 16:11)

1. Khar'kovskiy gosudarstvennyy institut po proyektirovaniyu promyshlennogo stroitel'stva. 2. Starshiy inzh. Khar'kovskogo gosudarstvennogo instituta po proyektirovaniyu promyshlennogo stroitel'stva (for Luchkovskiy). 3. Glavnyy arkhitektor tekhnicheskogo otdela Khar'kovskogo gosudarstvennogo instituta po proyektirovaniyu promyshlennogo stroitel'stva (for Khazanovskiy).

LUCHMAN, L. I.; ISAYEV, A. I.; ZOREV, N. N.

"Application of Ceramic Materials for Machining of Metals," Stanki i Instrument, No. 4, April 1952, pp 12-14.

Analysis B-85830, 26 May 55

NAZAREVSKIY, S.I.; MAKAROV, S.N.; PILIPENKO, F.S.; GERASIMOV, M.V.; IL'INSKAYA, M.L.; VEKSLER, A.I.,[deceased]; VASIL'YEV, I.M.; IL'INA, N.V.; SOKOLOV, S.Ya.; LOZINA-LOZINSKAYA, A.S.; SAAKOV, S.G.; ZALESSKIY, D.M.; AVERIN, N.A.; IVANOV, M.I.; PRIKLADOV, N.V.; SOBOLEVSKAYA, K.A.; SALAMATOV, M.N.; MALINOVSKIY, P.I.; LUCHNIK, A.I.; KRAVCHENKO, O.A.; VEKHOV, N.K.; GROZDOV, B.V.; MASHKIN, S.; BOSSE, G.G.; PALIN, P.S.,(g.Shuya, Ivanovskoy oblasti); MATUKHIN; ZATVARNITSKIY, G.F.; GRACHEV, N.G.; CHERKASOV, M.I.; KIRKOPULO, Ye.N.; LEVITSKAYA,A.M.; GRISHKO, N.N.; LIKHVAR', D.F. VIL'CHINSKIY, N.M.; LYPA, A.L.; OREKHOV, M.V.; SHCHERBINA, A.A.; TSYGANKOVA, V.Z.; BARANOVSKIY, A.L.; GEORGIYEVSKIY, S.D.; STEPUNIN, G.A. OZOLIN, E.P.; LUKAYTENE, M.K.; KOS, Yu.I.; VAIL'YEV, A.V.; RUKHADZE, P.Ye.; VASHADZE, V.N.; SHANIDZE, V.M.; MANDZHAVIDZE, D.V.; KORKESHKO, A.L.; KOLESNIKOV, A.I.,(g. Sochi); SERGEYEV, L.I.; VOLOSHIN, M.P.; RYBIN, V.A.; IVANOVA, B.I.; RYABOVA, T.I.; GAREYEV, E.Z. ;RUSANOV, F.N.; BOCHANTSEVA, Z.P.; BLINOVSKIY, K.V.; KLYSHEV, L.K.; MUSHEGYAN, A.M.; LEONOV, L.M.

Talks given by participants in the meeting. Biul.Glav.bot.sada no.15: 85-182 '53. (MLRA 9:1)

1. Glavnyy botanicheskiy sad Akademii nauk SSSR (for Makarov,Pilipenko, Gerasimov, Il'inskaya, Veksler); 2. Akademiya komunal'nogo khozyaystva imeni K.D. Pamfilova for Vasil'yev); 3. Vsesoyuznaya sel'skokhozyaystvennaya vystavka (for Il'ina); 4. Botanicheskiy sad Botanicheskogo instituta imeni V.L.Komarova Akademii nauk SSSR (for Sokolov, Lozina-Lozinskaya, Saakov); 5. Botanicheskiy sad Leningradskogo

(continued on next card)

NAZAREVSKIY, S.L.---(continued) Card 2.

gosudarstvennogo ordena Lenina universiteta (for Zalesskiy); 6. Polyarno-Al'piyskiy botanicheskiy sad Kol'skogo filiala imeni S.M. Kirova Akademii nauk SSSR (for Avrorin); 7. Botanicheskiy sak pri Tomskom gosudarstvennom universiteta (for Ivanov); 8. Botanicheskiy sad pri Tomskom gosudarstvennom universiteta imeni V.V. Kuybysheva (for Prikladov); 9. TSentral'nyy Sibirskiy botanicheskiy sad Zapadno-Sibirskogo filiala Akademii nauk SSSR (for Salamatov, Sobolevskaya); 10. Botanicheskiy sad Irkutsko gosudarstvennogo universiteta imeni A.A. Zhdanova (for Malinovskiy); 11. Altayskaya plodovo-yagodnaya opytnaya stantsiya (for Luchnik); 12. Bashkirskiy botanicheskiy sad (for Kravchenko); 13. Lesostepnaya selektsionnaya opytnaya stantsiya dekorativnykh kul'tur tresta Goszelenkhoz Ministerstva kommunal'nogo khozyaystva RSFSR (for Vekhov); 14. Bryanskiy lesokhozyaystvennyy institut (for Grozdov); 15. Botanicheskiy sad pri Voronezhskom gosudarstvennom universitete (for Mashkin); 16. Orekhovo-Zuyevskiy pedagogicheskiy institut (for Bosse); 17. Botanicheskiy sad pri Rostovskom gosudarstvennom universitete imeni V.M. Molotova (for Matukhin); 18. Botanicheskiy sad Kuybyshevskogo gorodckogo otdela narodnogo obrazovaniya (for Zatvarnitskiy); 19. Zoobotanicheskiy sad pri Kazanskom universitete (for Grachev); 20. Gosudarstvennyy respublikanskiy proektnyy institut "Giprokommunstroy" (for Cherkasov); 21. Botanicheskiy sad Odesskogo gosudarstvennogo universiteta imeni I.I. Mechnikova (for Kirkopulo); 22. Botanicheskiy sad pri Dnepropetrovskom gosudarstvennom universitete (for Levitskaya); 23. Botanicheskiy sad

(continued on next card)

NAZAREVSKIY, S.L.---(continued) Card 3.

Akademii nauk USSR (for Grishko, Likhvar', Vil'chinskiy); 24. Kiyevskiy sel'skokhozyaystvennyy institut (for Lypa); 25. Botanicheskiy sad Chernovitskogo gosudarstvennogo universiteta (for Orekhov); 26. Botanicheskiy sad pri L'vovskom gosudarstvennom universitete imeni Iv. Franko (for Shcherbina); 27. Botanicheskiy sad Khar'kovskogo gosudarstvennogo universiteta imeni A.M. Gor'kogo (for TSygankova); 28. Botanicheskiy sad Zhitomirskogo sel'skokhozyaystvennogo instituta (for Baranovskiy); 29. Botanicheskiy sad Akademii nauk Belorusskoy SSR (for Georgiyevskiy); 30. Institut biologii Akademii nauk Belorusskoy SSR (for Stepunin); 31. Botanicheskiy sad Akademii Litovskoy SSR (for Lukaytene); 32. Botanicheskiy sad Latviyskogo gosudarstvennogo universiteta (for Ozolin); 33. Kabardinskiy krayevedcheskiy botanicheskiy sad (for Kos); 34. Sukhumskiy botanicheskiy sad Akademii nauk Gruzinskoy SSR (for Vasil'yev, Rukhadze); 35. Batumskiy botanicheskiy sad Akademii nauk Gruzinskoy SSR (for Shanidze); 36. Tbilisskiy botanicheskiy sad Akademii nauk Gruzinskoy SSR (for Mandzhavidze); 37. Sochinskiy park Dendrariy (for Korkeshko); 38. Gosudarstvennyy Nikitskiy botanicheskiy sad imeni V.M. Molotova (for Sergeyev, Voloshin); 39. Krymskiy filial Akademii nauk SSSR (for Rybin); 40. Botanicheskiy sad Moldavskogo filiala Akademii nauk SSSR (for Ivanova); 41. Botanicheskiy sad Botanicheskogo instituta Akademii nauk Tadzhikskoy SSR (for Ryabova); 42. Botanicheskiy sad Kirgizskogo filiala Akademii nauk SSSR (for Gareyev); 43. Botanicheskiy

(continued on next card)

NAZAREVSKIY, S.L.---(continued) Card 4.

sad Akademii nauk Usbekskoy SSR (for Rusanov, Bochantseva); 44. Botanicheskiy sad Akademii nauk Turkmenskoy SSR (for Blinovskiy); 45. Respublikanskiy sad Akademii nauk Kazakhskoy SSR (for Klyshev, Mushegyan).

(Botanical gardens)

LUCHNIK, N.V. LUCHNIK, N.V

SUBJECT USSR / PHYSICS CARD 1 / 2 PA - 1760
AUTHOR LUÇNIK,N.V.
TITLE Alcohol and Ionizing Radiation.
PERIODICAL Atomnaja Energija, 1, fasc.5, 134-135 (1956)
Issued: 1 / 1957

Several previous works dealing with this topic are mentioned. Several authors suggested alcohol for treating radiation sickness, but because alcohol is so easily accessible, such opinions may lead to an excessive consumption of alcoholic drinks, which would be most undesirable on account of the damaging effects of alcohol and because as yet little is known about its curative properties. The results obtained by some experiments carried out by the author in his laboratory on the application of alcohol as a remedy against the effects of radiation seem rather to indicate that more damage than good can be done in this case by alcohol. The aforementioned tests were carried out with white mice, and the radiation used on this occasion with γ-rays of Co^{60} had an efficiency per dose of 42 roentgen per minute. The tests were carried out with mice of both sexes and of three different breeding lines as well as different degrees of radiation sensitivity. For the female animals of the breeding lines M, Ch, and N the dose which leads to the death of 50% of the animals after 30 days is 460, 560, and 590 roentgen respectively, and in the case of male animals of the line N it is 530 roentgen. In the case of mice having an average weight of 20 g, 50 g of alcohol was in each case injected into the intestines of the animals in form of an aqueous solution of 25%. The results of these experiments are shown in a

Atomnaja Energija,1,fasc.5,134-135 (1956) CARD 2 / 2 PA - 1760

table and confirm the data which are available concerning the curative properties of alcohol. However, alcohol produced different effects in the case of different types of mice, and a real reduction of mortality figures is found only with male and female animals of certain lines. On the average, however, the protective effect produced by ethyle alcohol is rather marked. According to the mortality curves illustrated in form of a table of mice subjected to a treatment with alcohol and others that were not, a difference in mortality was found to exist throughout the entire duration of the test. (Of 78 animals among whom some were treated with alcohol and some not, 43 and 21 mice remained alive respectively). The curative effect of alcohol is limited by the dose of radiation. After irradiation alcohol produced no curative effect, i.e. it is not able to reduce mortality. Large but not fatal quantities of alcohol administered on the background of radiation kill the mice. This effect is particularly marked in connection with the injection of alcohol, on which occasion from 150 to 200 mg of alcohol per mouse was injected into male animals with a radiation dose of 700 roentgen. A table illustrates the considerable and quite real increase of the toxic effect of alcohol while a strong dose of radiation is brought to bear. However, also in this case injection before radiation offers a certain protection. The curative effect of the alcohol is apparently due to its influence on metabolism. The concrete biochemical mechanisms must yet be made the object of research.

INSTITUTION:

LUCHNIK, N.V.

Effect of fractionizing and size of the dose on the cytological effect of radiation. Biofizika 1 no.7:633-641 '56. (MLRA 9:12)

1. Institut biologii Ural'skogo filiala Akademii nauk SSSR, Sverdlovsk
(RADIATION--PHYSIOLOGICAL EFFECT)
(CHROMOSOMS)

EXCERPTA MEDICA Sec.2 Vol.10/10 Phy.Biochem. Oct 57

LUCHNIK N. V.

4137. LUCHNIK N. V. Lab. of Biophys., Ural Branch, Acad. of Scis of USSR, Sverdlovsk. *Effect of irradiation with radioactive cobalt on the nucleic acid content of the spleen (Russian text) BIOKHIMIJA 1956, 21/6 (668-670) Graphs 1 Tables 1

The RNA and DNA content of the spleen of white mice was determined 2, 9 and 16 days after sublethal irradiation. After 2 days the RNA content decreases 10 times and that of DNA 8 times. The changes in the RNA content precede those of DNA. The regeneration process is preceded by a rise of RNA which towards the 16th day attains a value twice as high as the normal one. By this time the DNA content returns to the normal level.

LUCHNIK, N. V.

"The Influence of Preliminary Irradiation of Mice on Their Subsequent Radioresistance," by N. V. Luchnik and V. G., Kulikova, Doklady Akademii Nauk SSSR, Vol 110, No 6, 21 Oct 56, pp 982-984

The authors have endeavored to determine the value and the timing of the optimum dose of preliminary irradiation which would cause decreased sensitivity to ionizing radiation and increased resistance to infection.

Experiments were performed on 579 mice which were subjected to preliminary doses of 15, 50, 100, 150 and 200 r with 10-day intervals between this and the second irradiation.

It was found that the greatest mortality decrease occurred in mice previously irradiated by 15 r (37% decreased mortality) and 150 r (83% decreased mortality); 92% of the controls died.

The authors' hypothesis was that small doses probably produce radiostimulation which represents a general biological mechanism, and that sublethal doses cause radioresistance due to hyperregeneration after the first injury.

Sum. 1391

LUCHNIK, N. V.

Preliminary irradiation of mice by 15 and 150 r at various periods before irradiation by absolutely lethal doses of 1,000 r, resulted in 100% mortality after various periods, proving that the development of resitance after various doses differs. Preliminary irradiation by 150 r showed a vary narrow optimum range of about 10 days between doses. Before this period resistance ever decreased. The increase in radioresistance after using 15 r was not as marked but persisted for a long time.

To follow up the stimulating effect toward radioresistance exerted by small doses, 10 microcuries were administered to mice, and 14 days later, when the mice still retained 50% of the radioactive cerium, they were interbred with each other and with normal mice. Not more than 0.03% of the radioactive material still remained in the first generation. At 3 and at 4 1/2 months of growth, first-generation mice were irradiated by 600 and 700 r respectively. There was no real genetic effect on radioresistance in the first generation.

The authors conclude that the prophylactic action of preliminary irradiation can be explained by at least two processes, i.e., small doses produce radiostimulation and sublethal doses increase resistance due to hyperregeneration after the first injury. (U)

54M. 1391

COUNTRY : USSR
CATEGORY : General Biology - Genetics

B-3

ABS. JOUR. : RZBiol., No. 1, 1959, No. 311

AUTHOR : Luchnik, N. V.
INST. :
TITLE : Cytological Analysis of the Action of Low and High Doses of Ionizing Radiations on Plants.

ORIG. PUB. : Tr. Vses. konferentsii po med. radiol. Vopr. gigiyeny i dozimetrii, L., Medgiz, 1957, *

ABSTRACT : The dry weight of plants stimulated with radiations is higher than that of the controls. Cells of stomata and subcuticular layer of stimulated pea plants are smaller than those of the controls. Pea seeds were soaked for 24 hours in solution of beta- radiators of stimulating concentration (0.25-2.0 m Curie/liter). The mitotic activity in the root meristem was found to be thereafter considerably higher than in the controls (up to 300-400%). Chromosome rearrangements were almost absent in the mitoses. Soaking in equivalent, in dosage, solutions of alpha-radiators had no effect on rate of mitosis and in most mitoses chromosome bridges and fragments were found.

CARD: 1/3

* 93-98.

24

CATEGORY :

ABS. JOUR. : RZBiol., No. 1, 1959, No. 311

AUTHOR :
INST. :
TITLE :

ORIG. PUB. :

ABSTRACT : Stimulation of mitoses is not connected with the death of a portion of the damaged cells; maximum of mitotic activity coincides with maximum frequency of the bridges and fragments. Calculations have shown that on passing through the nucleus the alpha-particle always causes a disruption of chromosomes, while on passage of a beta-particle the disruptions are not always observed (they are induced only by the "tail" of the track). The assumption is made that absorbed energy of beta-particle can bring about changes which stimulate mitosis. A dosage imparted over a long period causes more frequently a stimulation. It is reported that H_2O_2, in certain dosages, also causes stimulation. The author draws the conclusion

CARD: 2/3

COUNTRY : USSR B-5
CATEGORY :

ABS. JOUR. : RZBiol., No. 1, 1959, No. 311

AUTHOR :
INST. :
TITLE :

ORIG. PUB. :

ABSTRACT : that stimulation of growth is caused by increase of mitotic activity, whereas inhibition of growth -- by death of cells as a result of chromosome rearrangements. -- V. V. Khvostova.

CARD: 3/3

25

TIMOFEYEV-RESOVSKIY, N.V., LUCHNIK, N.V.

Radiation injury and protective measures. Pt. 1: Classifying possible measures of protection against the total effect of radiation. Trudy Inst.biol. UFAN SSSR no.9:57-69 '57 (MIRA 11:9)
(RADIATION PROTECTION)

LUCHNIK, N.V.

Radiation injury and protective measures. Pt; Mortality of irradiated mice and rats as influenced by strain, sex, weight, and radiation dose, and their time mortality curve. Trudy Inst.biol. UFAN. SSSR no.9: 70-106 '57 (MIRA 11:9)

(RADIATION--PHYSIOLOGICAL EFFECT)

KULIKOVA, V.G., LUCHNIK, N.V., TIMOFEYEV-RESOVSKIY, N.V., TIMOFEYEVA-RESOVSKAYA, Ye.A.

Radiation injury and protective measures. Pt. 3: Influence of heterogenous serums, some hormones, and previous exposure on the effect of subsequent irradiation in mice. Trudy Inst.biol. UFAN SSSR no.9:107-128 '57 (MIRA 11:9)

(RADIATION PROTECTION)

LUCHNIK, N.V.

USSR / General Biology. Physical and Chemical Biology. B-1

Abs Jour: Ref Zhur-Biol., No 18, 1958, 80914.

Author : Luchnik, N. V.
Inst : Not given.
Title : Concerning the Anomalous Reaction of Irradiation in Small Doses.

Orig Pub: Biofizika, 1957, 2, No 1, 86-93.

Abstract: Pea seeds were soaked in solutions of an unseparated mixture of uranium chips in the concentration of 0.25 - 640 microcurie/l, and in 48-96 hours the percentage of the ana - and telophases with chromatin aberrations were determined. The dependence of the effect upon the concentration in large doses is described by means of an exponential function; however, lower doses provoke a disproportionately high effect, so that

Card 1/3

USSR / General Biology. Physical and Chemical Biology. B-1

Abs Jour: Ref Zhur-Biol., No 18, 1958, 80914.

Abstract: the common curve may be divided into two components. Similar curves testify to the heterogenity of the irradiated material. The calculation shows that, in the described experiments, 12% of the cells are considerably more sensitive than the rest. The author considers that the radiosensitivity of the cells undergoes cyclical modifications, in connection with which an anomalous reaction is especially expressed in an expanded irradiation. There is described the appearance of over-fragmentation, which consists of the disintegration of the chromosomes into a great number of fragments; this appearance is characteristic for expanded irradiation, and its expression depends very little on the common dose. There

Card 2/3

USSR / Human and Animal Physiology. The Effect of Physical Factors. Ionizing Irradiations. T

Abs Jour: Ref Zhur-Biol., No 22, 1958, 102362.

Author : Luchnik, N. V.
Inst : Not given.
Title : On the Temporal Distribution of Mortality of Irradiated Animals.

Orig Pub: Biofizika, 1957, 2, No 4, 487-494.

Abstract: With a precision of plus-or-minus 8 hours, the life span of mice of varying radiosensitivity ($DL_{50/30}$ for doses of 410-590 r) was determined after single general gamma-irradiation by means of Co^{60} in doses of 200-30 000 r, as well as the life span of rats after Roentgen irradiation (intensity of dose from 10-290 r per min.). The curves of the time distribution of mortality were polyconic and showed, in

Card 1/3

that the degree of ... tions of the experiment, which were not taken into account. The analysis of PM of 150 females of the same line under identical experimental conditions evidenced a lesser relative height of the second

Card 2/3

USSR / Human and Animal Physiology. The Effect of Physical Factors. Ionizing Irradiations. T

Abs Jour: Ref Zhur-Biol., No 22, 1958, 102362.

Abstract: PM. It is assumed that the PM are the reflections of various final causes of death of irradiated animals. -- L. I. Samoylova.

Card 3/3

LOCKHEED, N.Y.

AUTHOR: Luchnik, N. V. 20-114-4-21/63

TITLE: The Influence of Hybridization Upon Radio Sensitivity (Vliyaniye gibridizatsii na radio-chuvstvitel'nost')

PERIODICAL: Doklady Akademii Nauk SSSR, 1957, Vol. 114, Nr 4, pp. 754-756 (USSR)

ABSTRACT: Reference is made to several previous works on this subject. Various authors give rather different values for the lethal dose for mice. But these differences cannot offhand be explained by genetic differences, for they may be explained by the difference in dosimetry, by various conditions of radiation and by the influence of concomitant factors. In order to clear up these problems the author carried out special experiments with 144 mice. All these animals were 2 months old males of approximately the same weight, they belonged to 6 different races. Two of them (C-57, black and CC-57, cinnamon-brown) were pure-bred. The genetic characteristics of the other four breeds were unknown. The animals were irradiated with γ-rays of Co^{60} (dose 600 r, efficiency of dose 10 r/min). The experimental results are compiled in a table and show the following: The radio sensitivity of mice of various breeds differs and this difference is statistically proved in a completely reliable manner.

Card 1/2

For this very reason it was interesting to try to increase the power of resistance against radiation by genetic methods in an artificial way. Within a certain breed the hybrids have an increased viability. It was interesting to find out whether by hybridization the power of resistance against the influence of ionizing rays could also be increased. For that purpose mice of the two purebred lines 57 and CC-57 as well as their hybrids were investigated. The test results illustrated by a diagram show the following: The mice of the two pure-bred breeds have about the same mortality (72,5 and 66,3%). With the same dose (600 r) all hybrids stayed alive. This difference is statistically proved, and was also confirmed by more accurate experiments. There are 2 figures, 2 tables, and 9 references, 5 of which are Soviet.

ASSOCIATION: Institute of Biology of the Ural Branch of the AS USSR (Institut biologii Ural'skogo filiala Akademii nauk SSSR)

PRESENTED: March 5, 1957 by L. A. Orbeli, Member, Academy of Sciences, USSR

SUBMITTED: March 7, 1957

Luchnik, N. V.

20-3-16/46

AUTHORS: Luchnik, N. V., Timofeyeva-Resovskaya, Ye. A.

TITLE: The Influence of the Potassium Cyanide Upon the Mortality of Irradiated Animals (Vliyaniye tsianistogo kaliya na smertnost' obluchennykh zhivotnykh)

PERIODICAL: Doklady AN SSSR, 1957, Vol. 116, Nr 3, pp. 407 - 410 (USSR)

ABSTRACT: First of all the attention is drawn to a number of preliminary works dealing with this subject. For their experiments the authors irradiated 77 white rats with X-rays (total dose of 500 r) and 339 mice of various species with γ-rays of Co^{60} (duration of irradiation 80 seconds to 90 minutes, total dose 500 to 800 r). The method of irradiation and the reaction of the experimental animals have already been described earlier (reference 11). The potassium cyanide has been introduced into the peritoneum, with rats 2,5 mg/kg and with mice 0,1 mg per animals at a weight of 20 g each. The results of the experiments with rats are illustrated in a diagram, 20 days after the irradiation 22 % of the control-rats were alive, as against 43 % of the animals treated with potassium cyanide during the same period. The introduction of potassium cyanide after the irradiation reduced the percentage of the surviving ani-

Card 1/3

The Influence of the Potassium Cyanide Upon the Mortality of Irradiated Animals

mals to a large extent. Thereby not only the final percentage but also the average duration of life was reduced. The majority of the animals died during the first week. The first experiments with mice yielded strongly negative results, the introduction of potassium cyanide reduced the chance of survival. The correlation of the duration of irradiation to the protective effect of the potassium cyanide is undubitable. The experiments carried out by the authors confirm the influence of the duration of irradiation upon the effect of the potassium cyanide. The results of the experiments with potassium cyanide on mice recall a little the data on the influence of carbon monoxide upon the effect of irradiation. But at the discussed experiments not only an increase of the damage effected by irradiation but also a weaker effect at an irradiation of shorter duration has been observed. This can probably be explained by the idiosyncrasy of the experimental animals. It is likely that the whole effect of potassium cyanide upon the mortality of irradiated animals is dependent on the favorable effect of hypoxia and on the damaging effect of the hereby developed compensatory respiration (which saturates the plexus with hydrogen-peroxide). To verify this conception special experiments have been carried out. One of the causes for the protective effect of the

The Influence of the Potassium Cyanide Upon the Mortality of Irradiated Animals

potassium cyanide is the duration of irradiation. If the conditions remain the same except for a shorter duration of irradiation the introduction of potassium cyanide reduces the mortality considerably, whereas the mortality at an irradiation of long duration increases. There are 2 figures, 2 tables, and 19 references, 2 of which are Slavic.

ASSOCIATION: Institute for Biology of the Ural Branch of the AN USSR (Institut biologii Ural'skogo filiala Akademii nauk SSSR)

PRESENTED: July 4, 1957, by L. A. Orbeli, Academician

SUBMITTED: June 25, 1957

AVAILABLE: Library of Congress

Card 3/3

LUCHNIK, N.V.

Protective compounds and mortality peaks in radiation injury. [with summary in English]. Biofizika 3 no.3:332-342 '58 (MIRA 11:6)

1. Institut biologii UfAN SSSR, Sverdlovsk.
(RADIOACTIVITY--SAFETY MEASURES)

LUCHNIK, N.V.

Effect of yeast extracts on irradiated organisms [with summary in English]. Biokhimiia 23 no.1:146-153 Ja-F '58. (MIRA 11:3)

1. Laboratoriya biofiziki Ural'skogo filiala AN SSSR, Sverdlovsk.
(ROENTGEN RAYS, effects,
eff. of yeast extracts on reactivity (Rus)
(YEASTS, extracts,
eff. on x-irradiated organisms (Rus)

PLISHKIN, Yu. M.; LUCHNIK, N.V.; TALUTS, G.G.

Spiral structure of the molecules of desoxyribonucleic acid and the mechanism of their cell-reproduction. Biofizika, 4 no.3:275-283 '59. (MIRA 12:7)

1. Ural'skiy filial AN SSSR, Sverdlovsk.
(DESOXYRIBONUCLEIC ACID,
spiral structure & auto-duplication (Rus))

LUCHNIK, N.V.

On the statistical management of correlated series. Farm. i toks. 22 no.4:375-378 Jl-Ag '59. (MIRA 13:1)
(STATISTICS)

24(0)

AUTHORS: Luchnik, N. V., Tsarapkin, L. S.

SOV/20-124-1-61/69

TITLE: On the Reversibility of Cytogenetic Injuries Caused by Radiation (Ob obratimosti tsitogeneticheskikh luchevykh povrezhdeniy)

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 124, Nr 1, pp 213 - 216 (USSR)

ABSTRACT: Although in biophysics of ionizing radiation it is a widespread opinion that radiation genetic cell-injuries are irreversible (Refs 1,2) the authors proved that by chemical effects (yeast extract, cystein) the percentage of cells with mutations of chromosomes can be reduced (Ref 4). The experiments described in the present paper give evidence of a partial reversibility of radiation injuries in chromosomes. Pea seeds and germs, irradiated with γ-rays of radiocobalt, served as experimental material. Mitotic activity was determined at different periods of time as well as the aberrations of chromosomes in their ano- and telophases. In addition to that an experiment with cystein solution was made. Cystein is known as a typical representative of "protective

Card 1/4

substances". It must be present in the cells during irradiation (Ref 5). It is, however, effective also after irradiation in the cells being in a mitotic and a relative metabolic inactivity (dry seeds). Table 1 gives results. It shows that the relative number of "bridges" forming the parts reconnecting the places of breaking increases under the action of cystein. This fact contributes towards an increasing chance of union. It is, however, true that the absolute number of bridges per cell does not increase (the same holds true for cells with bridges) but decreases by almost 50%. This is why under cystein effect also the total number of primary bridges decreases. As cystein was applied after irradiation it can be assumed that the breaking of the chromosomes does not occur during irradiation, but later. Therefore, it is irradiation which causes immediate potential injuries which later on are detected as aberrations of chromosomes. It can therefore be assumed that potential injuries can be spontaneously healed again. In order to check this assumption the dry irradiated seeds were caused to germinate. Figure 1 shows the results. The number of anomalous mitoses

decreases rapidly with progressing time. The only plausible explanation of this phenomenon is the spontaneous restitution of potential injuries. In order to be able to investigate this in detail the cystein effect was investigated with respect to the kinetics of restitution of potential injuries of dry seeds, irradiated with 15 000 r. Furthermore, germs were investigated which immediately before being irradiated with 800 r were subjected to a treatment with cystein. Figure 2 and table 2 give the results. They remind of the regularities of suppression of the first mitosis after irradiation (Refs 2,8). As explanation of the phenomena observed the authors provide a working hypothesis. Local variations in the chromosome are caused by its permeation by ionizing particles; later on it is possible that the mentioned variations become visible as breaks or aberrations. This depends on the entire state of the cell which may vary greatly under the influence of various factors. The injury of the protoplast as a whole plays a part, too. By this hypothesis the differences with respect to radio sensitivity

On the Reversibility of Cytogenetic Injuries Caused by Radiation

SOV/20-124-1-61/69

of seeds in different stages and many other phenomena can be explained. N. V. Timofeyev-Resovskiy and V. I. Korogodin took part in the discussion of the problems mentioned in this paper. There are 2 figures, 2 tables, and 11 references, 5 of which are Soviet.

ASSOCIATION: Institut biologii Ural'skogo filiala Akademii nauk SSSR (Institute of Biology of the Ural Branch, Academy of Sciences, USSR)

PRESENTED: August 28, 1958, by I. I. Shmal'gauzen, Academician

SUBMITTED: August 27, 1958

Card 4/4

17(3), 17(4)
AUTHOR: Luchnik, N. V.

SOV/20-126-2-53/64

TITLE: On the Rôle of Nucleosidepolyphosphates in Cell Division and in the Autoreproduction of Nucleic Acids (O roli nukleozidpolifosfatov pri delenii kletok i autoreproduktsii nukleinovykh kislot)

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 126, Nr 2, pp 417-420 (USSR)

ABSTRACT: Some yeast extracts reduce, when used after the irradiation, the radiation effect (paper of the author, Ref 1). It was found that the anti-radiation properties of these extracts are related to the ribonucleic acid fraction (RNA). They occur therefore only if the yeast cells are for a long time exposed to a weak damaging influence before the extraction (lower temperature, drying, irradiation). Apparently some substances are either formed or accumulated in the yeast cells under unfavorable conditions which do, however, not stop the metabolism and have anti-radiation properties. As data were available according to which the normalization of the cell division rate plays an important rôle in the anti-radiation effect (Refs 1,2) special experiments were carried out in order to check this explanation again. This normalization was related to the accelerated synthesis of the desoxy-ribonucleic acid (DNA). Figure 1 shows the results of the effect of a diluted yeast extract (1 : 1000) upon the

percentage of the pea root cells which begin to divide and were treated with 625 r of the γ-rays from Co^{60}. Details of the method are given in reference 3. They show that the extract does not inhibit the initial reduction of the mitotic activity - that, however, 12 hours after the irradiation the percentage of the cells which begin to divide is higher if the yeast extract is used (a) than in the control (b). In the case of (a) the mitotic activity becomes normal after 48 hours, whereas it is still considerably reduced after 72 hours in the case of the control (b). Figure 2 shows the influence of the yeast extract on the DNA-content in pea cells which were irradiated with 500 r. This indicates that the DNA-content is (a) higher all the time as compared with the control (b) if the extract is added. This is especially striking after 12 hours, i. e. when the reduction begins. The beginning of the restoration of the DNA-synthesis coincides with the occurrence of the favorable effect of the extract on the mitosis rate. Thus a causal relation exists between these two indices. From the above-mentioned data the conclusion is drawn that the nucleic acid fraction of the yeast extract from damaged yeast cells is able to accelerate the cell division and the DNA-synthesis under the

conditions of the radiation damage. Furthermore comparative experiments were carried out with five different yeast extracts, i.e. with respect to their biological activity and the chemical characteristics of their nucleic acid fractions. Their production method is described (Refs 1, 2, 6). The biological activity was determined in experiments with mice (dose 500 r of γ-rays from Co^{60}) and peas (dose 600 r). Extracts were interperitoneally introduced into mice; pea germs were treated with an extract solution of 0.001%. Mortality of mice was found to occur within 20 days, the percentage of the pea root cells which begin to divide, 48 hours after irradiation. Table 1 shows that the chemical characteristics of the RNA fraction are closely related to one another as well as to the biological activity of the extracts. Table 2 shows the statistical exploitation of the results. The data on the mutual dependence of the chemical characteristics (Fig 3) show that the total content of nucleic acid - phosphorus is negatively correlated to the precipitating ability (i. e. the molecular size); however, positively correlated to the content of "excessive phosphorus" in the liquid above the sediment. From that can be concluded that the increase of the RNA content in yeast cells is accompanied by a reduction of the number